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ahead because the other is behind, as a continual catching myself from falling in the direction in which my body is moving, as an intricate system of muscular checks and balances calling into service an intricate nervous system of finely adjusted interactions. Such a cross-section analysis of my activity may be correct in every detail yet be relatively meaningless as an explanation of my activity. Its explanation can be found only when the cross-section is made lengthwise, and includes my whole procedure from house to mail box. The significance of the detailed behavior becomes evident only in the light of my larger and more inclusive behavior. This last-mentioned behavior is, again, only relatively self-complete, and for more complete understanding must be related to my larger schemes of behavior. In other words, any detail of my behavior is a phase of all my behavior, often as important a phase of my future behavior as of my recent or remote past.

The systems of behavior represented by various living species of animals are not of equal import, much less are the systems of behavior represented by various individuals of equal import. Often, the significant thing about the behavior of an individual is its relation to the behavior which characterizes his historical epoch or his class. Man as a species represents types of behavior and man as a historical creature represents progressive changes in types of behavior. The importance we assign to individual behavior must depend upon the importance we assign to types of behavior. These types may be potential as well as actual ones, unrealized as well as completed histories.

As history itself, though concerned with the past, can never be concerned with the past as such, but must possess selective insight and philosophic guidance, so a psychology concerned with behavior can never be concerned only with behavior. It must be concerned with some types more than with others, with the significant rather than the insignificant. Behaviorism is a point of view and must justify itself by its fruits. It can classify under its categories, but must itself submit to classification. By whatever behavioristic term the test be called, behaviorism must submit to the test of significance and value.

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BOOK REVIEWS

Evolutionary Naturalism. ROY WOOD SELLARS. Chicago: The Open Court Publishing Company. 1922. Pp. 343.

This volume invites attention as the first published attempt to base a metaphysical system upon critical realism. Professor Sellars

believes that a new naturalism, supplanting the older materialism, is indicated when the categories are examined in the light of an adequate epistemology and when principles derived from a study of the biological sciences are given due importance in metaphysical explanation. The insufficiency of the older materialism is ascribed to its tendencies to hypostasize scientific concepts and to reduce biological to physico-chemical processes without a remainder.

Two chapters are devoted to an account of the epistemological foundation on which the author's metaphysics is based. This account does not differ from his earlier writing on the same subject. He maintains that physical entities are not objects in their own right, but are made such by the selective activities of the organism. Objects are known by means of data in consciousness which, however, are wholly subjective and existentially distinct from the objects known. Thus knowledge is not intuitive, as idealism and naïve realism suppose, but mediate. Nor is knowledge obtained from data which are copies of physical entities, for by means of data we know objects, not our subjective states. The adequacy of cognition rests on the fact that nature controls the knowledge-process in the interest of biological adaptation. The categories, therefore, are truly informative of the physical world, for "nature itself would need to change before they would become invalid" (p. 81).

The major portion of the book is given over to discussion of the individual categories. It is emphasized that there are different levels and contexts of interpretation from sensation to conception and abstraction, and that a true estimate of the value for knowledge of any category can be obtained only by a genetic consideration. The author finds these levels of interpretation continuous in the main and informative of the physical world. Thus the sensational elements of our spacial experience connect naturally with the conceptual, and even abstract mathematical space gives information about real space.

"Space as a category is not an external reality. To assert that the physical world is spacial, means, not that the physical world is *in* a non-dynamic receptaculum analogous to mathematical space, but that certain predicates are interpretative of its actual constitution and nature" (p. 99). These predicates are found in judgments of position, relative size, contour, distance, and direction. "*These elements give the very meaning of space as a category*" (p. 99). In like manner, "temporal contrasts should not be read too naïvely into nature" (p. 120). The world is temporal, rather than in time. Sellars subordinates the category of time to that of change; real time is change in the physical world.

In his treatment of things and their properties, the author reaches the conclusion that the distinction between substance and properties is epistemological rather than ontological. A substance is the subject of predication in a judgment. Hence it was supposed that there was a unitary and unknowable substance supporting properties. The true view, however, is that properties are simply the elements of our tested thought of the thing. Things *are* (partially) their known properties. All sense-data are materials for knowledge; all qualities are contentually subjective; the distinction between primary and secondary qualities rests on either an intuitionist view of knowledge or a naïve copy-theory. Qualities and quantities are not opposed; colors, tastes, and odors, as well as shape and size, are indicative of physical conditions. But "in no case is there assumed to be a *resemblance* between a sense-datum and its external cause. What does hold is an ordered correlation so that to every difference in the one there is a difference in the other manifold. It is because of this ordered correlation that we are able to infer the size, structure, behavior, position and internal constitution of physical objects" (p. 188).

The evolutionary naturalist is a pluralist and is sympathetic with the doctrine of external relations as against logical monism. He finds, however, both continuities and discontinuities in nature, and he maintains that the question whether any particular relation is internal or external is to be decided solely on empirical evidence. Many biological relations are internal, and the character of their terms has become modified from the time when they entered into relation. Relations themselves must not be reified; there are terms *in* relation, not relations *and* terms.

Russell's mathematical analysis of motion, while defended, is declared not to be exhaustive. Motion, for Professor Sellars, is a case of behavior implying energetics, and back of motion lies force. He recognizes that if we use the concept of force as a principle of explanation instead of passing to a quantitative description of its manifestations, we shall get nowhere, but he says that the limitations of our knowledge should not be permitted to empty reality of any content for which we have an empirical basis. (One may question whether he has been equally scrupulous in respect to the empirical content of colors and odors.) We are urged irresistibly to the positing of force in objects by our fundamental realistic belief that bodies are something in themselves and have a determinate nature. But it is not admissible to follow idealism in its belief that the activity which we experience in consciousness is the only type of activity in nature.

We must avoid interpreting the world in terms of human agency, as well as the tendency to reduce causality to logical implication. Like other categories, causality is informative of reality. Causality is more than sequence, more even than a uniformity of sequence. It tells us that change is not adventitious, but that it "grows out of the very heart of that which changes. But, if so, change throws light upon the nature of the changing system; it is the kind of a system to produce this change as an end-term" (p. 248). A scientific treatment of causality as opposed to a naïve view seeks to appreciate, not two factors, but all the factors at work. Causality is not purely temporal; it is spacial as well, and it signifies the activity of a changing system.

Freedom, treated in the manner made familiar by the writings of Windelband and others, is reconciled with determinism by analysis of the meaning of these concepts. These attempts fail alike to explain the crucial instance of the exercise of freedom when the self is "divided." Novelty is regarded as descriptive of the evolutionary process, but not as in conflict with continuity. From Professor Sellars' own standpoint, I can not but feel that novelty would find more satisfactory interpretation as a subjective category. If real time is change in the physical world, novelty would be a concept that we would apply to the succeeding state as compared with the former, when there was a striking alteration in data. Empirical teleology is defended. It is especially apparent in organisms, where each organ has its function which assists in the working of the whole. "This ordering is maintained by structural and functional coördinations" (p. 337). We must be careful not to inject naïve anthropomorphism into the concept, but on the other hand we must not underestimate the physical world. The chapter which deals with mechanism and teleology is especially vague and inconclusive.

The fact that the structure of consciousness reflects the position and adjustments of the organism suggests that there is no existential independence of consciousness from the brain. The burden of proof that there is a separation rests upon dualism. "Evolutionary naturalism does not believe that the higher levels of nature are purely mechanical; it accepts critical points with resultant new properties" (p. 292). "Who has a right to say *a priori* how great a novelty may arise and so set limits to the possibilities of nature?" (p. 297). The author describes his view as a development of the double-aspect theory based on critical realism (p. 294). Consciousness, however, is not an aspect of the whole physical world, but a novel aspect of brain-activity, functional in char-

acter. The biological sciences indicate that an organized system is more than the sum of its parts, and that a whole may exert control over its parts. Thus consciousness is efficacious. The brain is "a stream of tendencies lit up by consciousness" (p. 316). "The contents of consciousness are correlative to neural processes which are not found at the inorganic level. They come and go, and yet, as memory shows, they are not completely lost. . . . The difference between the conscious and the unconscious must be one of degree and not of kind" (p. 318).

Critical realism steers a middle course between skepticism and intuitionism. When a critical realist seeks to build a metaphysical system in harmony with his epistemology, one is interested in watching how far his faith will carry him. Faith here is acceptance of data as revelatory. The question arises (and the answer given will vary with the individual thinker), what aspects of the conscious content shall be accepted as mediating knowledge of a reality beyond the knower? Professor Sellars finds his answer to this question in his faith in the results of the special sciences, the achievements of enlightened common-sense. That he is not entirely successful from the metaphysical standpoint is partly due to the limits which bound his faith. But one wishes that he had broadened somewhat his own method of investigation. He is so deeply interested in inquiring about the nature of the physical world that it has not occurred to him that a correlative study is that of the characteristics peculiar to conscious processes. He has studied the character of data only in reference to their cognitive value. Now science reaches knowledge that is *formal* in character. And the knowledge of the physical world which Professor Sellars defends is, correspondingly, a knowledge of "size, structure, behavior, position, and internal constitution of physical objects." But he has not explained by a study of the conscious process the reason why knowledge is thus limited. He has chosen rather, except perhaps in his treatment of force, to ignore the fact that physical science can not do without a fundamental substance, whether ether or electricity, and to assimilate naïvely substance and quality to structure.

While this mode of procedure is not entirely unconvincing in his discussion of the inorganic, it encounters vast difficulties when he comes to treat the mind-body problem. Here the only correlations of which he can speak are those of structure and function. The warm, sensuous characteristics of conscious qualities have not been anticipated by a slow evolution of substance. They burst out of structural properties in a way that Professor Sellars can de-

scribe only by the word "novelty." We must not indeed "set limits to the possibilities of nature," but reason herself sets certain limits beyond which she encounters the irrational. If, as the author himself avers, in conscious activity alone we are "on the inside," evolutionary naturalism might lead more readily in the direction of pan-psychism or Haeckel's monism. Either of the latter would afford a better escape from dualism—which, of course, is equally compatible with critical realism.

Professor Sellars is to be commended in his attempt to square critical realism with naturalism. His writing suffers, however, from a disorderly style. The headings and sub-headings of the individual chapters are clear, but their matter often reads like a note-book, rather than like a finished treatise. This fault is unfortunate in an age when philosophers are striving to reach mutual understanding.

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